

# REPORT DOCUMENTATION PAGE

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# TRIAD : Quarterly R & D Status Report

Prof. David R. Cheriton  
PRINCIPAL INVESTIGATOR  
cheriton@dsg.Stanford.EDU  
(415)-723-1131

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## Abstract

This material is based upon work supported by the Defense Advanced Research Projects Agency Information Technology Office, ARPA Order No. H719, Program Code No. 9E20, issued by DARPA/CMD under Contract # MDA972-99-C-0024.

Distribution of this report is unlimited.

## 1 Progress in Reporting Period

The final approval and distribution of funds occurred at the end of July, 1999 so actual funded work started on August 1, 1999. Separate funds were used during June and July to fund one research assistant, Mark Gritter, who was switched to DARPA funding at that time.

We have immediately started drafting a TRIAD architecture document, and skeletal version exists and receiving some internal review.

There are also initial drafts of documents on the name-based routing protocols we see required as well as the shim protocol, which we have renamed WRAP (Wide-area Relay Addressing Protocol) from RAP, to minimize confusion with other use of the same acronym. There is also a early draft document in WRAP security.

We ave started work on a WRAP implementation in the Linux kernel and also on modifications to a DNS server. Further, work is underway adapting an existing IP multicast application, the RAT audio conferencing tool, to work with our single-source multicast. This work is to gain initial experience as a primary to developing middleware supporting scalable multicast applications.

We have been in contact with the chairpersons of several IETF WGs as well as the End-to-end Internet Research Task Force (Bob Braden) about our work.

### 1.1 Information from Trips, Meetings. etc.

Prior to the contract start, the PI funded two research assistants out of separate funds to attend the IETF in Oslo, Norway, to initiate contact and discussion with IETF working groups relevant to this work, including the NAT WG, IPsec WG, DNS WG and IPng WG. This trip was very productive in terms of information and contacts.

### 1.2 Major Items Purchased or Constructed

There were none, although we received a donated gigabit Ethernet switch from Cisco.

### **1.3 Changes in Key Personnel**

No change in PI. Addition of five research assistants, namely: Mark Gritter, Chetan Rai, Vince Laviano, Jonathan Stone and Dan Li.

### **1.4 Summary of Problems**

There are no significant problems at this early stage. The most mentionable is perhaps the challenge of hiring a research associate to join the project. However, we have had only a short time to work that problem, and expect to be able to maintain good progress with additional research assistants in the meantime.

### **1.5 Related Accomplishments**

A new processor scheduling algorithm BVT we developed earlier that is attractive supporting real-time together with interactive and batch processing, as in fact can arise on a modern router or switch, was substantially refined and written up, for publication and presentation at the Symposium on Operating Systems Principles in December 1999. Using our Linux implementation of this scheduling algorithm, we expect to explore the use of this scheduling in the router-resident software (and host software) we develop as part of this contract.

## **2 Planned Activities**

Over the next quarter, the project has outstanding research assistants in place and the PI working aggressively on refining and extending the draft reports of our architecture, basic protocols and deployment scenarios and strategies. We also plan to put considerable effort into developing the prototype implementations further, all following the plans of our original proposal.

We plan to have one or more of the TRIAD project members attend the IETF in Washington in early November. We also plan to attend and talk at the DARPA PI meeting on Active Networks in mid-November.

The PIP has been invited to present this work to Braden's E2E IRTF meeting, hosted at Cisco in early December 1999.

We plan to continue to work to staff up the project plus provide suitable equipment for the project members, exploiting in part a grant from Intel to augment our resources.

## **3 Fiscal Status**

R&D Status Report  
Program Financial Status  
7/28/99-9/30/99  
DARPA/CMD Contract #MDA972-99-C-0024

Cumulative To Date			At Completion		
Planned Expend Oct-Dec99	Actual Expend	% Compl	BAC	LRE	Remarks
\$75K	\$11K	2%	\$1,574K	N/A	

Based on currently authorized work:

- (1) Is current funding sufficient for the current FY? Yes
- (2) What is the next Fiscal Year's funding requirement at current anticipated levels? \$529K
- (3) Have you included in the report narrative any explanation of the above data and are they cross-referenced? No